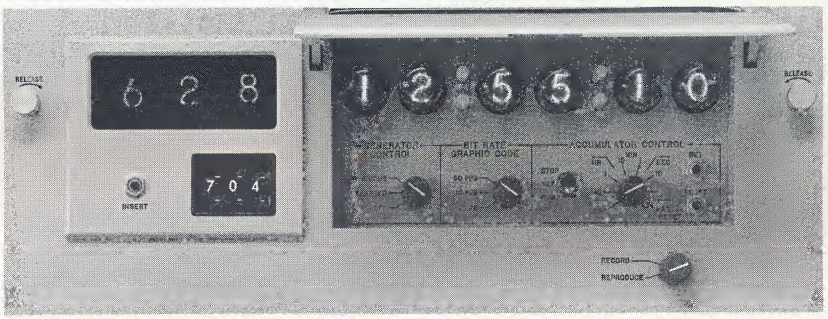
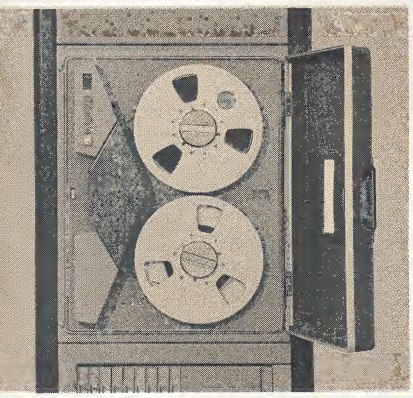
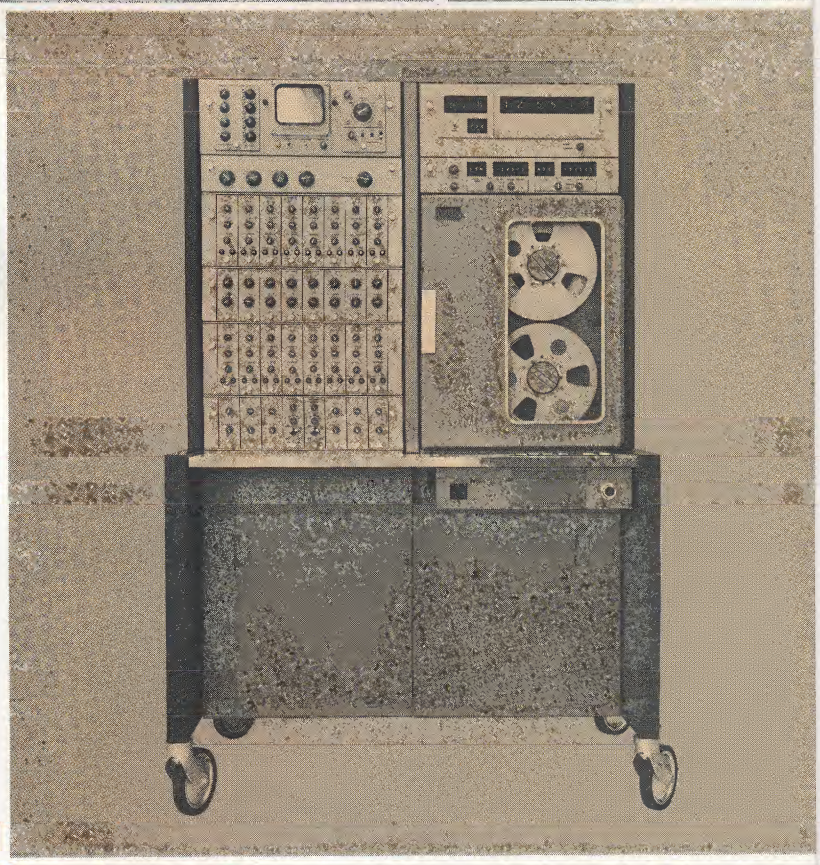




TCS-100 Time Code System identifies and retrieves data on magnetic tape... controls tape transport automatically. Designed for use with Ampex FR-1200, FR-1300, DAS-100 Instrumentation Recorders.





# AMPEX TCS-100 TIME CODE SYSTEM

# AMPEX TCS-100 TI
# ACCURATE, CONVE

## FEATURES

*Time Code Generator*

- Generates time code in hours, minutes, seconds.
- Reads the code during Reproduce. Displays on Nixie tubes hours, minutes and seconds in all operating modes.
- Can include optional 3-digit identification number code and visual display.
- Reproduces tape made on other generators using IRIG B code.

*Tape Control Unit*

- As an accessory to the Time Code Generator, controls transport when preset start and stop times are reached.
- Allows selection of record, drive (reproduce), cycle, or stop.
- Can be set to respond to time in hours, minutes and seconds, or identification numbers, or both.

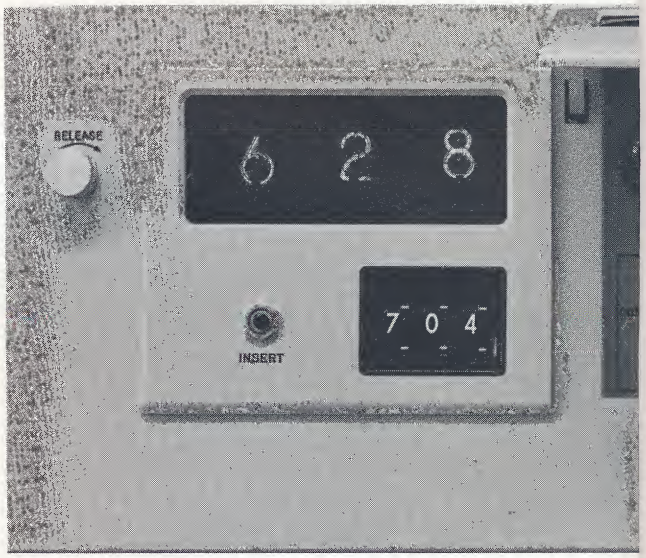
The Ampex TCS-100 provides extremely accurate location and identification of all data for editing and retrieval. It can be used with the Ampex FR-1200, FR-1300, and DAS-100 Instrumentation Recorders. Time in hours, minutes and seconds is recorded on one track of the tape, and can be read during all operating modes (Record, Reproduce, Fast Forward, Rewind and Stop) on a 6-digit visual display. A time record thus becomes a permanent part of the data, so that the original time scale of the test or experiment is never lost, even if a portion of the tape is cut out or spliced into another tape. For automatic retrieval of data, the system can include a Time Code Tape Control unit which automatically searches the tape for a specific segment of data. When located, the transport will respond in one of several operating modes as chosen by two selector switches on the Time Code Control unit: one switch for Record, Drive or Stop at the beginning of the interval, and a second switch for Rewind or Stop at the end. By selecting Drive at the beginning and Rewind at the end, the recorder will cycle independently between the two points. In some cases, this can eliminate the need for a separate loop recorder. For identification of experiment, test, subject, or day of the year, the system can also include a 3-digit identification num-

# ME CODE SYSTEM: NIENT, TIME-SAVING

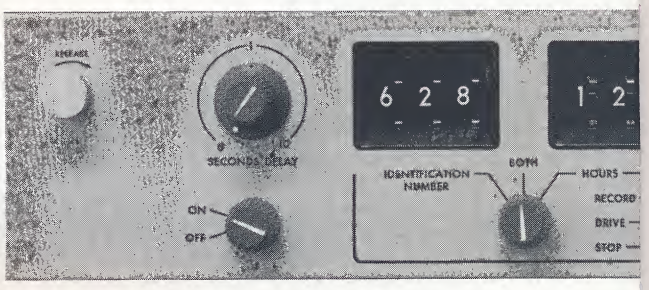
ber unit. With this unit, a 3-digit number can be entered and recorded with the time data, and similarly reproduced, displayed (on three additional displays), and searched like the time code. A simultaneous graphic recorder code is also provided as an output at any one of three bit rates to match graphic recorder operating speeds, for simultaneous recording on auxiliary recording devices.

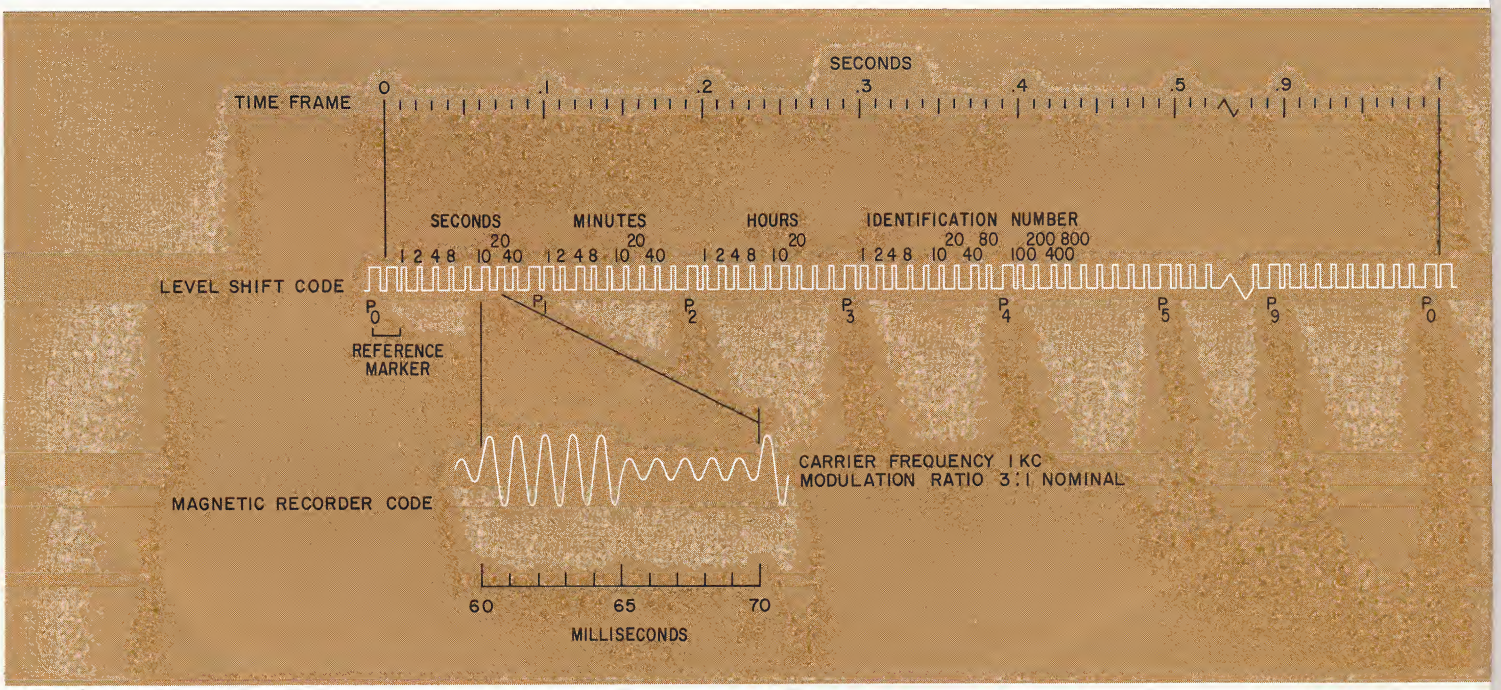
Continuous visual monitoring is provided by six Nixie tubes in all operating modes: Record, Reproduce, Fast Forward, Rewind and Stop. No equalizer change is required when reproducing the code over this wide range of speeds. Three additional Nixie tubes can be added to display the identification number.

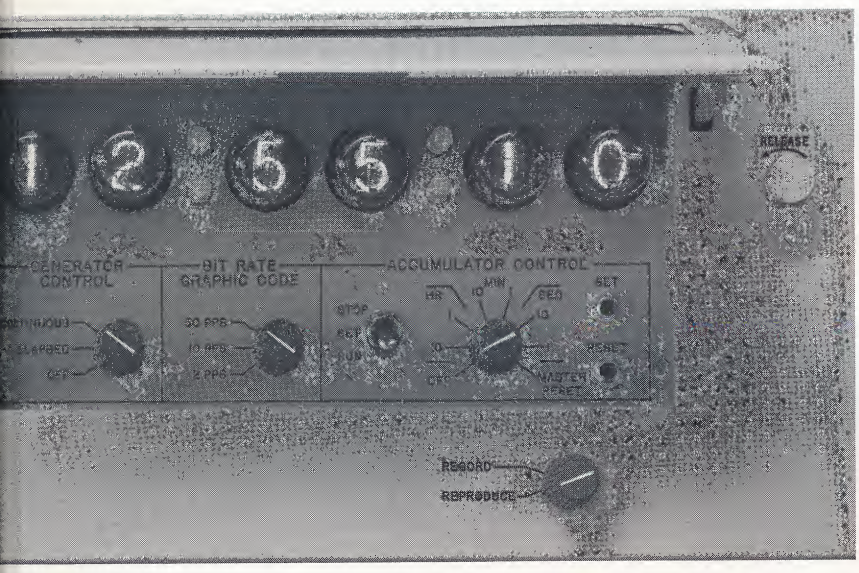
Modular in construction, the TCS-100 uses all solid state circuitry mounted on plug-in boards. The overall system is made up of: 1) a Time Code Generator which not only generates the code, but also reads it and provides a visual display, plus: 2) an accessory Tape Control Unit which automatically places the tape transport in any of its operating modes when a specific segment of data has been located.




**Tape Control Unit** permits selection of operating mode when
If control is set up at "Stop," the TCS-100 will stop at time
switches. If switch is in "Stop," the recorder will halt. If it






**Time Code Generator Unit** access door, normally closed, is open to illustrate all controls. Nixie tubes show time being recorded or played back. Generator control sets continuous or elapsed time; Graphic control sets rate to match graphic recorder input. Accumulator control permits fast setting of clock. For example, to set in 12:55:10, reset to zero, then turn the accumulator control to 10 hours, push button and the tubes will show 10. Turn to 1 hour and punch twice to get 12. Minutes and seconds work the same way. The set-button controls only the decade selected with accumulator control knob.

To the left of the time code generator is the Identification Number Unit. Nixie tubes show number being recorded or reproduced. The thumbwheel switch sets the number desired. The insert button transfers the number selected for recording and display.

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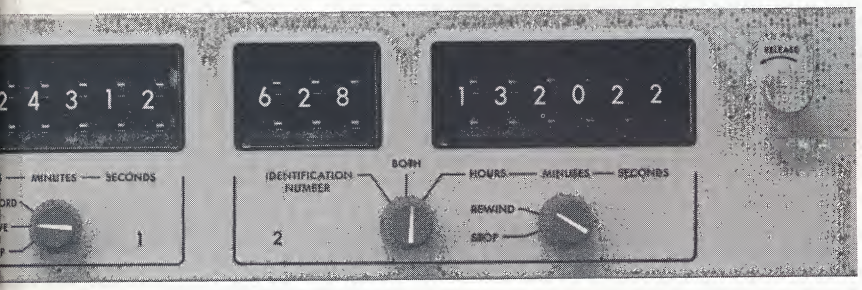
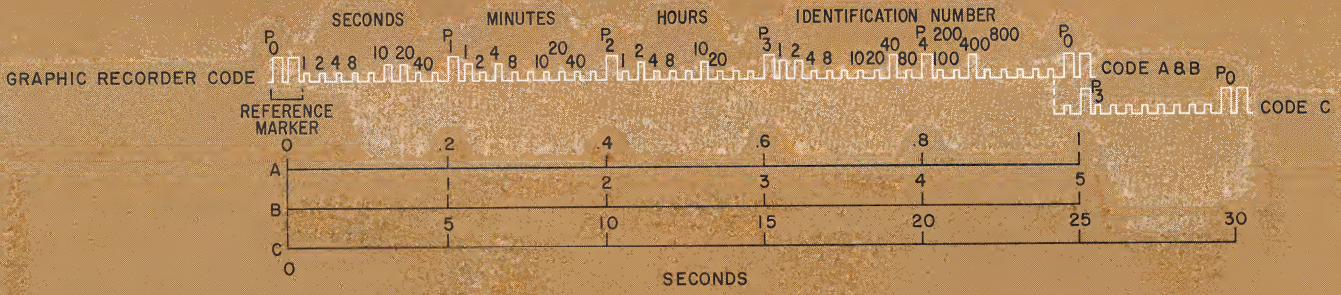
en specific segment of data has started or ended. Record-drive-stop control is used with Time 1 as set up on the thumbwheel switches. ne shown in Time 1. If switch is set to "Drive," it will put transport in "Drive" mode. The end of the sequence is set up on right-hand it is in "Rewind," the entire cycle will be repeated until a new command is issued. If the control switch is in "Record," the unit will wait for coincidence between time inserted and time being generated. The tape recorder will then start and run until it reaches time set on Time 2 thumbwheel switch.

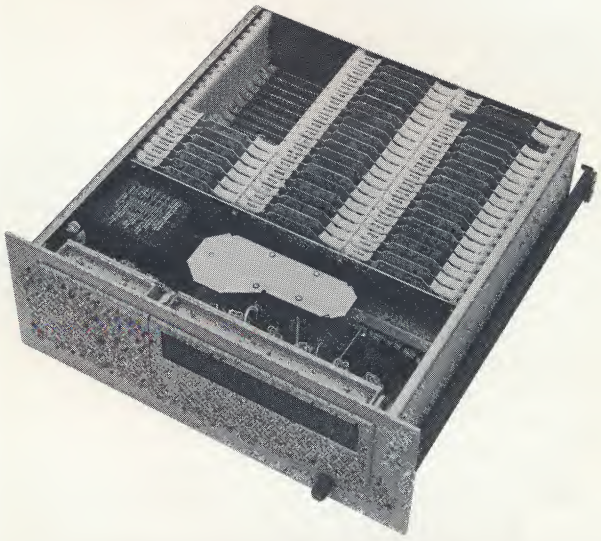



The "Both" position serves a useful function for spliced tapes. In this position, the recorder control is initiated by coincidence of either identity number or time. Segments of the tape with the same time but different identity numbers can be searched out and reproduced.




**NOTES:**

1. Time shown: 12 hours, 5 minutes, 30 seconds. Identification number 443.
2. If identification number is not present, these bits are zeroes.
3. Magnetic recorder code is compatible with IRIG Format B, except for substitution of identification number for days of year.



Construction detail and plug-in printed circuit boards. Entire unit is drawer mounted and will pull forward from rack for front accessibility.

## APPLICATIONS

Use the TCS-100 system to find a particular segment of data in a reel of tape. It saves search time because it works in both fast forward and rewind and continuously displays the time and identification number on the Nixie tubes without changing the reproduce equalizer. It is particularly valuable where the data acquisition point is geographically removed from the computation point. For example, a materials testing engineer may record data at an outlying field site and then send the tape to a central facility for analysis. These can easily be identified and located, saving expensive computer time. Since the time code becomes a permanent part of the data, pertinent sections can be cut out and spliced together while still maintaining positive identification.

It can also be used to mark the time on a graphic recorder at the same time you are recording *or* playing back tape data. Both time and identification number will fit on one channel of the graphic recorder.

And you can also perform repetitive data analysis with great speed and precision since the TCS-100 will shuttle between two preset points indefinitely. In some cases, this can eliminate the need for a separate loop recorder.

The system is designed to work with the tape recorder's Direct electronics. Under some conditions it can also operate with FM electronics. Consult your Ampex engineering representative for more specific information.

## COMPONENTS DESCRIPTION

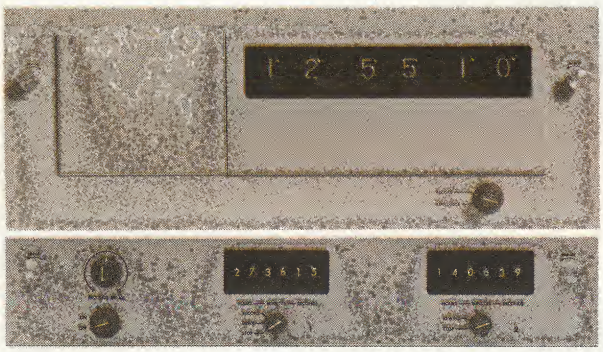
***Time Code Generator***

The Generator produces a modified IRIG B serial time code of hours, minutes and seconds up to 24 hours. With this code, a 1000 cps carrier is amplitude modulated by a pulse width modulated digital code. Each time frame is one second long. The first 300 milliseconds contain the entire time for the frame and the last 700 are occupied by position identifier pulses and by zeros. It is possible to resolve time within the frame to 1 millisecond.

Depending on the mode you choose (by means of a front panel control), the clock will drive the Time Code Generator continuously so that time advances one second per second or alternately, only when the Record control is activated on the recorder. The tape can thus be marked with either real or elapsed time. Hours, minutes, and seconds are visible on the Nixie tubes during all operating modes.

For versatility with a variety of recorders, the TCS-100 will reproduce the time code at a rate up to 200 times faster than the record speed or up to 16 times slower. This wide range allows high speed search in fast forward and rewind, plus full recovery of time data when playing back at a speed different from the original recording speed. Input voltages from the recorder to the Time Code Generator can vary over a wide range.

Time Code Generator outputs can control several tape recorders, graphic recorders and other peripheral equipment in both record and reproduce. To



**TCS-100 Time Code System**—alternate version without the optional three-digit Identification Number feature.

provide compatibility with everything from a light beam galvanometer to the slow strip chart recorder, the Time Code Generator provides graphic code frames of 1 second, 5 seconds or 30 seconds. For peripheral equipment, such as analog-to-digital converters, analog multiplexers and other a/d programmers, pulse rate outputs of 1000, 100, 10, 1 and 0.1 pulses per second are also available.

### *Time Code Generator Identification Unit*

This unit records and reads a 3-digit identity number, so that you can identify an experiment not only by the time at which it occurred but also by experiment, patient, sequence number or day of year. Three additional Nixie tubes are provided to indicate the identity number already recorded or available for recording. Any number from 000 to 999 can be manually selected by thumbwheel switches. The setting of the identification number is unaffected by the operation of the clock.

### *Tape Control Unit*

Operating the transport in conjunction with the Time Code Generator, this unit controls the transport according to a time code previously recorded on the tape. It compares the reproduced time code (as read by the Generator) with a time manually set in the control unit, and automatically controls the transport when time coincidence occurs.

Two sets of thumbwheel switches permit setting of both a start and stop time on the panel.

### *Tape Control Identification Number Kit*

With this kit you can preset the machine to start and stop with number identification, time, or with both.

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